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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
| 10/598,450 | 03/13/2007 | Yoichi Ohmura | 403777/AOYAMA | 5559 |
| 23548 | 7590 | 05/28/2008 | EXAMINER | |
| LEYDIG VOIT & MAYER, LTD 700 THIRTEENTH ST. NW SUITE 300 WASHINGTON, DC 20005-3960 | | | KO, TONY | |
| ART UNIT | PAPER NUMBER | | | |
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

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|------------------------------|--------------------------------------|--------------------------------------|
| Office Action Summary | Application No. 10/598,450 | Applicant(s) OHMURA ET AL. |
| | Examiner TONY KO | Art Unit 2878 |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If no period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED. (35 U.S.C. § 133).

Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) Responsive to communication(s) filed on _____.
 2a) This action is FINAL. 2b) This action is non-final.
 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) Claim(s) 1-13 is/are pending in the application.
 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
 5) Claim(s) ____ is/are allowed.
 6) Claim(s) 1-4,7,9 and 11-13 is/are rejected.
 7) Claim(s) 5,6,8 and 10 is/are objected to.
 8) Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

9) The specification is objected to by the Examiner.
 10) The drawing(s) filed on 31 August 2006 is/are: a) accepted or b) objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) All b) Some * c) None of:
 1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. _____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) Notice of References Cited (PTO-892)
 2) Notice of Draftsperson's Patent Drawing Review (PTO-948)
 3) Information Disclosure Statement (PTO-1668)
 Paper No(s)/Mail Date 8/31/06 and 11/30/07

4) Interview Summary (PTO-413)
 Paper No(s)/Mail Date _____
 5) Notice of Informal Patent Application
 6) Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 9, 12 and 13 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.
3. Regarding claim 9, it is unclear what it means having "grating in which optical path difference varies sinusoidally"? Does the light path varies sinusoidally when light passes through the grating?
4. Regarding claim 12, it is unclear what does "a spatial distribution of transmittance that varies sinusoidally" mean? How does a grating exhibit the property of spatial distribution of transmittance without energy sources? Further, it is unclear whether the grating is made to vary the transmittance of light passes through the grating wherein the intensity of the light passed through the grating varies sinusoidally. Clarification is needed.
5. Regarding claim 13, it is unclear what is "the third grating period"? It is understood that the third grating amplitude modulates the light. Does the term "including" a plurality of "the" light detecting elements meaning these detectors are in addition to the ones claim 1 already recites? It is further unclear how the detecting elements (discretely arranged) are integrated with the grating (Which is continuously

construed). Further more, it is unclear what does it mean to have detecting elements and the grating integrated together?

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 1, 2, 3, 7, 9 and 13 are rejected under 35 U.S.C. 102(b) as being anticipated by Mayer (U.S. Patent 6,472,658).

8. Regarding claim 1, Mayer discloses (Figs. 1 and 2) an optical encoder comprising: an incoherent light source (4); a first grating (1), which is an amplitude grating having a first grating period, for spatial amplitude modulation of the incoherent light from the light source; a second grating (2), which is a phase grating having a second grating period, for spatial phase modulation of light from the first grating; a third grating (3) which is an amplitude grating having a third grating period, for spatial amplitude modulation of light from the second grating; and light detecting element (5) for detecting light from the third grating, wherein the encoder detects relative displacement between respective gratings.

9. Regarding claim 2, Mayer teaches the second grating is a transparent phase grating having an indented shape with ridges and valleys and a duty ratio of substantially 50% (see figure 1 or 2), in which optical path difference between a ridge

and a valley of the second grating is substantially equal to $\lambda/2$, wherein λ is wavelength of light. (See. Col. 4, lines 30-31)

10. Regarding claim 3, Mayer teaches the second grating is a transparent phase grating having an indented shape with ridges and valleys and a duty ratio of substantially 50% (see figure 1 or 2), in which optical path difference between a ridge and a valley of the second grating is substantially equal to $\lambda/4$, wherein λ is wavelength of light. (Col. 6, lines 10-15)

11. Regarding claim 7, Mayer teaches wherein the first, second and third gratings have a same period P , and both a first distance between the fist and second gratings and a second distance between the second and third gratings are substantially an odd integer multiple of $P^2/(4\lambda)$, wherein λ is wavelength of light. (See column 1, where Mayer teaches the general formula for distance z is equal to nP^2/λ . A formula further taught by Mayer is shown in Col. 4, line 54. $\lambda/4$ is used for this particular case see Col. 4, line 53. By substituting the values into the formula in column 4, the result clear shows the claim language is anticipated. Subsequent claims relate to the distances between the gratings are rejected base on the same logic).

12. Regarding claim 9, as understood, Mayer teaches the second grating is a phase grating in which optical path difference varies sinusoidally.

13. Regarding claim 13, as understood, Mayer teaches a plurality of detecting elements arranged discretely at the third grating period, and the third grating and the light detecting elements are integrated with each other. That is, the light passes through third grating passes onto the detecting elements.

14. Claims 1, 4 and 11 are rejected under 35 U.S.C. 102(b) as being anticipated by Nihommori (U.S. Patent 6,635,863).
15. Regarding claim 1, Nihommori teaches (Fig. 2) an optical encoder comprising: an incoherent light source (3); a first grating (6), which is an amplitude grating having a first grating period, for spatial amplitude modulation of the incoherent light from the light source; a second grating (11), which is a phase grating having a second grating period, for spatial phase modulation of light from the first grating; a third grating (7), which is an amplitude grating having a third grating period, for spatial amplitude modulation of light from the second grating; and a light detecting element (5a) for detecting light from the third grating, wherein the encoder detects relative displacement between respective gratings.
16. Regarding claim 4, Nihommori teaches (Fig. 2) the second grating (11) is a reflective phase grating, and the first (6) and third gratings (7) are arranged on the same side with respect to the second grating (See figure 2).
17. Regarding claim 11, Nihommori teaches the gratings have rotary scale (see figures 1 and 2).

Allowable Subject Matter

18. Claims 5, 6, 8 and 10 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

19. Regarding claims 5 and 6, prior art does not teach a ridge and a valley of the second grating is substantially equal to $\lambda/4$ or $\lambda/8$ wherein λ is the wavelength.
20. Regarding claim 8, prior art does not teach both a first distance between the first and second gratings and a second distance between the second and third gratings are substantially odd integer multiples of $P^2/(4\lambda)$, where λ is wavelength of light.
21. Regarding claim 10, prior art does not teach a first distance between the first and second gratings is different from a second distance between the second and third gratings, and the ratio of the first distance to the second distance is substantially equal to the ratio of the first grating period of the first grating to the third grating period of the third grating.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to TONY KO whose telephone number is (571)272-1926. The examiner can normally be reached on Monday-Friday 7:30 - 4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Georgia Epps can be reached on 571-272-2328. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/TKO/

/Georgia Y Epps/
Supervisory Patent Examiner, Art Unit 2878